REMARKS

In the above identified Office Action, the Examiner rejected Claims 1 – 20 under 35 U.S.C. §102(e) as being anticipated by Vangal et al.

In response to the 102 rejection, Applicants amended the independent claims (i.e., Claims 1, 6, 11 and 16). Specifically, Applicants specify that data transaction is facilitated by a computing device which assembles data from N aggregated TCP-offloaded adapters and channels data associated with a particular connection from the network to a selected TCP-offloaded adapter. Support for the added language can be found on page 10, lines 27 – 29 and page 16, lines 6 – 21 as well as Fig. 4 (see switch 430). Thus, no new matter is added to the Application.

The independent claims were also amended to better claim the invention. Dependent Claims 2, 3, 5, 10, 15 and 20 were amended to better claim as well.

By this amendment, Claims 1 – 20 remain pending in the Application. For the reasons stated more fully below, Applicants submit that the claims are allowable over the applied reference. Hence, reconsideration, allowance and passage to issue are respectfully requested.

As disclosed in the SPECIFICATION, with the advent of high bandwidth-consuming applications such as on-line content, e-commerce, network databases, streaming media etc., network connection bandwidth requirements for ISPs (Internet Service Providers), ASPs (Application Service Providers), streaming media providers have increased exponentially. One of the methods used to meet this increase in connection bandwidth requirements is link aggregation. (Note that a link, in this context, is a connection between a physical network port on one system to a physical network port on another or the same system.)

Link aggregation is a method by which physical network links are combined into a single logical link. Stated differently, link aggregation allows two or more links to be bundled together (i.e., aggregated) to form a group. In a link

aggregation group of N links, there are N parallel point-to-point links. Therefore, if a host system has three 1Gbits/sec Ethernet adapters, the host may transact data using all three adapters and thereby triple its network connection bandwidth.

However, there are certain disadvantages associated with link aggregation. For example, in traditional system architectures, hosts' processors process network data traffic as well as run applications. Therefore, the more time is spent processing network data traffic, the less time there is for running applications. With increases in TCP/IP (Transport Control Protocol/Internet Protocol) networking speeds, brought about by high speed Ethernet adapters and/or link aggregation among others, more time is spent processing network data. It is estimated that Gigabit Ethernet data traffic processing alone can consume nearly all of a host processor's cycles. This, obviously, robs a system of its performance.

To solve this problem, TCP data processing has, in some cases, been relegated (i.e., offloaded) to an embedded processor on the Ethernet adapters, freeing up the host processor for running applications and performing other tasks. However, due to the nature of TCP-offloaded adapters, they cannot be aggregated, defeating the purpose of link aggregation.

For example, when conventional Ethernet adapters are used in link aggregations, TCP data processing is handled by the host. Thus, TCP state information including memory for reassembling incoming data and memory for TCP send buffer etc. is stored in the host. Since the TCP state information is stored in the host and since the host performs the TCP data processing, the adapters may then be viewed as a data relay mechanism. Thus, any one of them may be used to relay data between a local host and a remote host.

In TCP-offloaded adapters, the TCP data processing is handled by the adapters. Thus, the TCP state information is contained exclusively on the adapter where the session originated. Consequently, it is not possible to send a data packet through one adapter and receive a reply belonging to the same TCP

connection through another adapter since the latter will not have the TCP state information necessary to process the packet.

Thus what is needed is a method of aggregating TCP-offloaded adapters. The present invention provides such TCP-offloaded adapters.

According to the teachings of the invention, N TCP-offloaded adapters are aggregated by assigning a common Internet Protocol (IP) address to the N TCP-offloaded adapters, where N is an integer. One of the N aggregated TCP-offloaded adapters through which a connection between the first and a second communications systems is to originate is selected. Then, data is transacted through a computing device. The computing device assembles data from the N TCP-offloaded adapters to remote systems and channels data associated with the connection to the selected TCP-offloaded adapter.

The invention is set forth in claims of varying scopes of which Claim 1 is illustrative.

> 1. A method of aggregating N Transport Control Protocol-offloaded (TCP-offloaded) adapters of a first communications system to augment network data transaction bandwidth of the first communications system by a factor of N, N being an integer, the method comprising:
>
> aggregating the N TCP-offloaded adapters by assigning a common Internet Protocol (IP) address to the N TCP-offloaded adapters;
>
> selecting one of the N aggregated TCP-offloaded adapters through which a connection between the first and a second communications systems is to originate;
>
> originating the connection using the selected TCP-offloaded adapter, the connection for transacting data over a network between the first and the second communications systems; and
>
> ***transacting data through a computing device, the computing device to assemble data from the N TCP-offloaded adapters to the network and for channeling data associated with the connection from the network to the selected TCP-offloaded adapter***. (Emphasis added.)

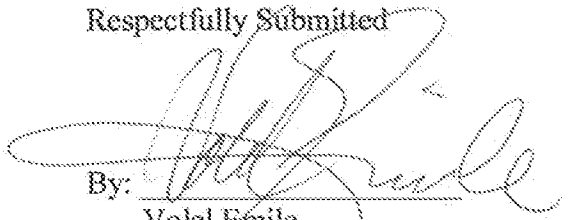
The Examiner rejected the independent Claims 1 - 20 under 35 U.S.C. §102(e) as being anticipated by Vangal et al. Applicants submit that the claims, as presently drafted, are patentable over the applied reference.

Vangal et al, purport to teach techniques for coordinating operation of multiple network protocol off-load engines (e.g., Transport Control Protocol (TCP) off-load engines). According to the teachings of Vangal et al., a scheme that aggregates multiple off-load engines is provided. In the scheme, a controller is used to distribute responsibility for handling different network connections across the different engines. When a packet arrives that identifies a connection not previously seen, the controller allocates an engine for handling the packet. An interface is also used to receive network data by the engine which, once processed by an engine, is sent to a host system.

However, Vangal et al. do not teach ***transacting data through a computing device, the computing device to assemble data from the N TCP-offloaded adapters to the network and for channeling data associated with the connection from the network to the selected TCP-offloaded adapter*** as claimed.

Consequently, Applicants submit that Claim 1, as well as its dependent claims, is allowable over the cited reference. The other independent claims (i.e., Claims 5, 11, and 16) and their dependent claims, which all incorporate the emboldened-italicized limitations of the above-reproduced Claim 1 are also allowable. Thus, Applicants once more respectfully request reconsideration, allowance and passage to issue of the claims in the application.

Respectfully Submitted



By: _____
Volel Emile
Attorney for Applicants
Registration No. 39,969
(512) 306-7969